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The Citrus Industry

MAR 1 2 1951

"Should I Buy A Citrus Grove?"

That is a question which is being asked by hundreds of Florida residents, particularly by recent additions to our population who have heard of the profits being made by citrus growers during the past two seasons.

The answer to that question may be found in an article under the above caption written by Zach Savage, Associate Agricultural Economist, Florida Experiment Station. No one in Florida, we believe, is better qualified to speak on the subject than he. His conclusions are based upon records of a great number of Florida citrus groves over a period of eighteen years. There is nothing spectacular about Mr. Savage's article. It is a plain and clear statement of actualities.

From these figures it would appear that if one is able to buy a sufficient acreage paying cash, or a greater part of the cost in cash, and holding as an investment, taking the good years with the bad and not depending upon the grove for living expenses, the answer is . . .

YES.

But if the purchaser pays only a small amount in cash on a small acreage, twenty acres or less, and depends upon the earnings of the grove to care for the interest, making payments on the principal and provide a living for the owner, then the answer would appear to be . . .

NO.

As stated above, if any one in Florida is qualified to speak with authority on this subject it is Mr. Savage. He knows.

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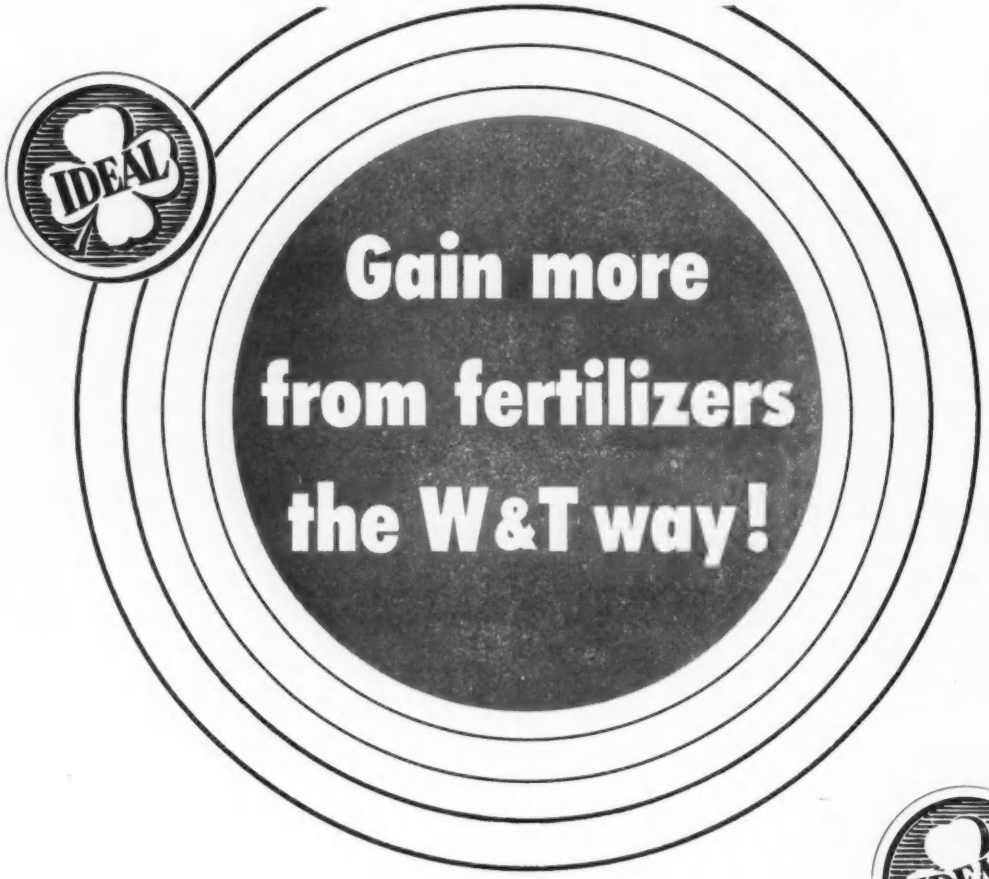

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Citrus Insect Control For March 1951

J. T. GRIFFITHS, W. L. THOMPSON AND R. M. PRATT*
CITRUS EXPERIMENT STATION
LAKE ALFRED, FLORIDA

In general, scale populations have remained at a low level during the past month, although there are indications at the present time that hatching of young purple and red scale is increasing. Scales are present in damaging numbers in relatively few groves.

Some increase in purple and rust mite activity has continued during the past month and many growers applied a dormant spray including sulfur and DN compounds for mite control. A few groves still have high populations of purple mites and rust mites where control measures have not been applied.

Many growers have noted severe leaf drop especially in grapefruit groves during the past few weeks. Examination of these leaves will usually show that the major portion of this drop has been caused by "greasy spot." Greasy spot occurs several months after a rust mite infestation has been present, and is not necessarily an indication that rust mites are still in the grove. This should point up the potential value of year round rust mite control.

Trees are growing over most of the citrus area; however, it appears that growth is slightly ahead in Orange and Lake Counties, intermediate in the Ridge and Central portions of the state, and later along the East Coast. This will probably mean that post-bloom spray operations will start somewhat earlier in Orange and Lake Counties and then proceed down the Ridge with applications starting later along the Indian River. It is probable that some copper sprays will be applied by mid-March.

Spray Recommendations

In most cases, spray recommendations for March are dictated more by considerations of season and stage of growth than by present trends in insect and mite conditions. The standard post-bloom spray for most groves will include a copper compound (equivalent to ¾ pound of metallic copper) and 10 pounds of wettable sulfur per 100 gallons for the control of melanose and rust mites. This spray may be applied anytime within 3 weeks after petal fall. Lime-sulfur may be included except when parathion or DN is used in the spray.

Zinc and borax may be included as nutritional elements at this time. Zinc may be used at 3 pounds of the sulfate plus lime or the equivalent in a neutral zinc compound. Do not use zinc oxide at this time as injury is likely to occur. Borax may be applied at 1 pound per 100 gallons.

Scale Insects

In those groves where scale insects have over-wintered in considerable numbers, several spray alternatives are possible. Either oil or parathion may be used for scale control at this time, and the grower will have to decide in each individual instance which one will offer him the best and the most economical method of control. Several possible combinations for scale and melanose control are offered below.

Pre-bloom oil sprays are often very satisfactory. Minimum damage is done to the tree, and because of the fact that foliage is sparse, excellent coverage can be obtained. Thus, a pre-bloom spray with oil may be indicated in some groves. Oil emulsion should be used at 1.3% actual oil. The spray should be followed with copper and sulfur at post-bloom time.

If it is desired to wait until the bloom has already set before oil is applied, oil may be combined with copper. Such copper-oil sprays give good scale and melanose control. Timing is critical for this spray and it should be applied as soon as possible after petal fall to reduce the likelihood of injury. In any case it should be applied within 3 weeks after petal fall.

Parathion may be used for scale control in either of two ways. Where heavy infestations occur, parathion should be applied at at least 1 2/3 pounds of a 15% material per 100 gallons. As many gallons of spray should be used per tree as if an oil spray were being applied. If a Speed Sprayer is being used, the machine should be driven at no more than 1 mile per hour and a single head should be in use. In other words, parathion must be applied in the same manner as oil if effective control is to be obtained. This application may be either pre- or post-bloom. Since the use of parathion requires an increased gallonage, the amount of copper and sulfur or any other materials included in this spray may be decreased proportionately to the increased gallonage. Thus, if 1 pound of sulfur would normally be used on the tree and the dosage with sulfur has increased the gallonage from 10 to 20 gallons, only half as much sulfur need be included in the parathion-sulfur mixture.

If scale infestations are light, it may be desired to use two applications of parathion during the year, each at 1 pound to the 100 gallons. This first application should be at post-bloom time. Again, under these circumstances, the application should be as thorough as with oil, but sulfur and copper may be reduced proportionately.

Parathion is effective at this time in preventing mealybug infestations later in the year. This is an added advantage gained from the use of parathion.

Purple Mites

If purple mites are present, several alternatives are offered. Generally, at post-bloom time, DN can be used with safety as long as temperatures remain below 88° and the new growth has hardened. Since DN-111 is on the market in Florida this year, it would be the material of choice as it is definitely less hazardous to use than DN Dry Mix. If temperatures reach 88°, Neotran, at 1½ pounds per 100 gallons may be substituted for DN. This is an expensive material and should be used only in cases of extreme emergency. As noted above, oil sprays may be worked into the spray schedule during March. These will give excellent control of purple mite infestations.

Grasshoppers

In those groves where grasshoppers have been present in previous years,

*Written February 23, 1951. Reports of surveys by Harold Holtsberg, Cocoa; J. K. Enzor, Jr., Tavares; K. G. Townsend, Tampa; J. B. Weeks, Avon Park; and J. W. Davis, Lake Alfred.

clean cultivation should be maintained throughout March and April. Reports of grasshoppers during the Fall of 1950 were very scanty, and it is not anticipated that serious infestations will develop during the Spring of 1951. However, infestations may be found in occasional groves and in these groves clean cultivation should be used to control the hoppers.

Aphids

It appears now that Spring growth will be uniform and this is usually not conducive to serious aphid infestations. However, aphid control may be necessary in some groves. Parathion (1 2/3 pounds per 100), nicotine sulfate (1-800), and TEPP (see manufacturers' recommendations) are all satisfactory for aphid control. Benzene hexachloride (2 pounds of 10½ gamma per 100 gallons) may be used on non-bearing trees only. Good coverage of terminal growth is necessary. Trees should be sprayed before foliage is badly curled.

For more specific information consult the Florida Citrus Experiment Stations at Lake Alfred or Fort Pierce.

STATE 4-H MEMBERS STRESS THRIFT FOR NATIONAL 4-H WEEK

More than 50 of Florida's 26,000 4-H boys and girls will appear before the civic clubs of their communities as part of the thrift program being carried out during National 4-H Club Week March 3-11.

Announcement of the planned appearances was made by Woodrow W. Brown, State 4-H Boys' Club Agent with the Agricultural Extension Service.

Besides the civic club programs, window displays are being arranged by county agents and their assistants and home demonstration agents with the cooperation of local merchants.

Rally days also are expected to be held for clubs in nearly all Florida counties, and radio programs and newspaper stories will highlight the thrift aims and accomplishments of club members.

WORKERS OVERCOME BY FUMES . . .

Fumes from a chlorine-base disinfectant threw 600 women into panic in one part of the big Pasco Packing Company plant at Dade City recently, and sent 175 of them to a hospital for treatment.

MR. CITRUS GROWER:
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THIS WINTER'S "unusual" weather has caused many varied conditions in groves in different sections — and even in different blocks of trees in one grove.

That's why special study of the needs of your trees is important to give your next crop the right start. The GULF Field Man in your section will be glad to help you plan ahead and recommend a dependable program of crop-care fitted to the needs of your particular grove. Ask him to call now.

You can always DEPEND ON GULF for products and service that help you produce better crops at economical cost.

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THE GULF FERTILIZER COMPANY
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EXCLUSIVE SPECIALIZED CITRUS PUBLICATION
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Representing no special interest

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Plant Inspection and Quarantine and Their Relationship To The Horticultural Interests Of Florida

ARTHUR C. BROWN
PLANT COMMISSIONER

ARTHUR C. BROWN

The well-being of the citrus and other horticultural interests of Florida—and the Nation at large—is dependent in large measure upon the absence of injurious insects or diseases. This freedom from infestation or infection is equally dependent upon an effective system of plant inspection and quarantine enforcement. These statements could be expanded so as to include man and animals as well as plants.

It is doubtful if there is any more efective means for the rapid and widespread dissemination of plant pests than through the movement of plants affected with injurious insects or diseases. It has been stated by competent authority that some ninety percent of the insect pests or plant diseases which have come to the United States from foreign countries, and which now cause loss or injury to our horticultural, agricultural and forestry interests of over one billion dollars annually, were introduced into this country on imported nursery stock or other plants or seeds. In this connection it is stated that most of the major insects and diseases present in the United States and responsible for this expenditure were brought into the country from abroad. These include Japanese beetle, European corn borer, Dutch elm disease, white pine blister rust, browntail and gypsy moths, Oriental fruit moth, codling moth, black stem rust, San Jose and other scale-insects, cottony-cushion scale, and others too numerous to mention.

Our own experience with citrus canker is indicative of the manner a disease may become disseminated over large areas through the movement of affected nursery stock in a comparatively short time. Citrus canker, a highly infectious bacterial disease which affects all parts of a citrus plant and for which there is no known means of control, was introduced into Texas about 1909 or 1910 on shipments of **Poncirus trifolita** seedlings from Japan. Infected seedlings were moved from Texas into Louisiana, Mississippi, Alabama, and Florida. By 1914 citrus growers and plant pathologists in all of the citrus-producing states of the South realized that the industry was confronted with a new disease of a most destructive nature and one apparently impossible to control by any means known at that time. There was no State agency in Florida with the authority to deal with situations of this nature, and the Legislature of 1915, at the insistence of growers, created the State Plant

Board and enacted legislation necessary for the Board to fight citrus canker, and other diseases and insects as well.

One of the first problems confronting the Board was to find out what citrus nurseries were, or had been infected with citrus canker, to what points these nurseries had shipped citrus trees, and whether these trees had developed infection after reaching the growers who received and planted them. It was learned that four citrus nurseries within the State were infected, and that these nurseries had made shipments prior to the discovery of citrus canker in them. It was also learned that 3,131 shipments of dangerous citrus nursery stock, comprising a total of 338,512 trees, had been moved to 427 destinations in 51 counties in the State. Several months of work were involved in finding these trees and inspecting them for evidence of citrus canker. The first inspection of those which could be located brought to light 62 centers of infection distributed through 21 counties scattered all over the State from Escambia on the west to Dade and Lee on the south. **Fifty-six, or ninety percent,** of these infections were found on shipments made by **one nursery company.**

Citrus canker was finally eradicated at a cost of $1,264,366.17 from State funds and $1,070,590.55 from federal sources. This does not include the value of 15,158 bearing and 342,260 non-bearing infected or "exposed" trees, which were destroyed by burning—the only known means for the control of the disease.

Man, for centuries, has endeavored to prevent the introduction into and spread within his particular locality of injurious insects and diseases. The earlier quarantines were for the most part designed to protect the health of citizens. The word "quarantine", as we know it, comes from the Italian word **quarantina,** which is derived from the Latin **quadraginta.** The word originally had reference to the period of forty days required between the arrival of a vessel suspected of having aboard passengers or crew infected with a contagious and malignant disease and the discharge of the passengers, crews, and cargoes. The meaning of the term originated, probably, in the fourteenth century, when Italy established quarantine regulations to govern travel and trade from countries to the east because of the presence therein of pestilence. At a later date France and other European countries promulgated similar regulations. Livestock quarantines originated during the latter half of the past century. The first record of a quarantine directed towards a plant pest is the German quarantine promulgated in 1872 for the purpose "of preventing the entry of the grape louse, Phylloxera, from the United States.'

In our own country, health regulations have been operative since Revoluntionary days. These were followed by livestock quarantines. It was not until 1912 that our own Government woke up to the fact that this country was the dumping ground for pest-ridden plant material from abroad, and Congress enacted the Plant Quarantine Act of 1912. This law provides the Secretary of Agriculture with authority to regulate the entry into and movement within this country of plants and plant products.

At that time and for a number of years subsequent, the enforcement of plant quarantines, domestic and foreign, was a comparatively simple and inexpensive undertaking. All travel and trade was by means of rail or water, and a few inspectors stationed at key points could effectively check the movement of regulated commodities. The bulk of the material consisted of plants or staple agricultural crops—the absence of refrigeration facilities made the long-distance movement of perishable fresh fruits or vegetables a risky proposition. The more or less limited transportation facilities available in those days, together with the presence of natural barriers such as oceans, mountain ranges, and deserts, which effectively checked the dispersal of insects and diseases, was not conducive to the rapid and widespread dissemination of plant pests and diseases.

Of all the major events of the past thirty years, probably none has effected a greater and more lasting impact on man's general scheme of life than the development of the internal combustion engine as a means for the rapid propulsion of vehicles. One change of tremendous importance has been a relegation of plant quarantine from its former important position as a first line of defense of our agricultural interests against invasion by alien plant pests to that of an outpost engaged in fighting a delaying action against such advances.

The popular and ever-increasing use of the motor vehicle and airplane as a means for the long-distance transportation of man and plant material has done away with the natural barriers which in the past slowed down the dispersal of insects and diseases and has provided a means, almost overnight, for the movement of affected plant material which, in so far as inter- and intrastate movement is concerned, it is wholly impracticable to control.

The expansion of international civil and military aviation into a tremendous world-wide activity offers a means for the rapid dissemination of insects and diseases —those which affect man and animals as well as plants—between countries located thousands of miles apart. These pests may be moved either as hitch hikers in the interior of the vehicles, or in or on plants and plant products in cargoes, ships' stores, air express and air mail, and passengers' baggage. Quarantine inspectors are of the opinion that plant material carried by mail and in the baggage of passengers is the most dangerous, in so far as the pest risk is concerned. Some idea as to the degree to which Florida is exposed to invasion by air-borne insects and diseases may be formed from the following tabulation depicting the number of arrivals from abroad of aircraft and passengers, as well as the quanity of baggage examined, during the biennium ending June 30, 1950:

During the same biennium Plant Board inspectors at the ports of

Record of Inspections of Air— and Watercraft, Passengers, and Baggage

Year	Total Number Air— and Watercraft Planes	Vessels	Total Number Passengers	Total Number of Pieces of Baggage Inspected
1948-49	19,826	4,303	327,467	833,710
1949-50	22,034	4,517	312,716	814,092

enrty in Florida* intercepted plant material of one kind or another from 108 different foreign countries and 7 foreign possessions. Included in the list are such widely separated countries as Yugoslavia and Mayala; Pakistan and Ireland; the Fiji Islands and Spain; Siam and the Union of South Africa; etc. Plant material prohibited entry or affected with major plant pests was intercepted and destroyed on numerous occasions. Live Mediterranean fruit fly larvae were intercepted in seven different lots of fruits or berries, while other fruit flies were intercepted on 67 different occasions.

These figures deal with the valume of foreign air traffic and interceptions of major plant pests at Florida ports only. Complete records for the Nation at large are not instantly available. It is known, however, that during the fiscal year 1949-50 a total of 4,650 lots of insects and diseases were intercepted on material brought in by airplane. Included were citrus blackfly; the Oriental, Mediterranean, Mexican, olive, West Indian, and five other species of fruit flies; mango weevil; sweet orange scab; lima bean scab; black spot of citrus; and citrus canker. Incidentally, one of the interceptions of Mediterranean fruit fly at New York was found in an air-express package of citrus fruits destined to a resident of Miami, Florida. Other major interceptions included the golden nematode of Irish potatoes and pests of pears and wheat.

It is unnecessary to remind the reader that we are living in a changing world: changes in governmental policies and practices; changes in our relationship with people in other countries; and changes in our own customs and procedures—in fact, changes everywhere. Plant quarantines—in fact, Public Health and Animal Industry—is no exception. There is a constant and powerful demand for changes in our clearance procedures for the purpose of speeding up the international air transportation of man and commodities. There has been created by Executive Order a federal Air Coordinating Committee. A subcommittee, known as the Committee for the Facilitation of International Civil Aviation, is charged with the responsibility of "studying problems brought about by foreign air travel and commerce and making revisions of existing governmental regulations dealing with such travel and commerce so as to adapt our clearance procedures (of Customs, Immigration, Public Health, and Plant Quarantine) to the needs of air transportation whenever needs for such changes are indicated." This Committee is composed of representatives from a number of governmental departments. It is interesting to observe that representatives of the commercial national and international air transport industries sit in on Committee meetings, make representations and offer technical advice. Commercial agriculture, on the other hand, must depend upon an employee of the Department of Agriculture to represent the Nation's agricultural interests at the meeting of this subcommittee.

Air transport officials seek changes which will increase pay loads and expedite the movement of planes and passengers from abroad. Businessmen seek changes which will hasten the movement of commodities shipped by air express. Air passengers demand changes which will bring about a more rapid movement through Public Health, Immigration, and Customs Inspection rooms at ports of entry.

Governmental officials must consider these requests for changes. One far reaching one is the recent recommendation that Customs discontinue its long-established and efficient policy of inspecting all of the baggage brought in from abroad and, in lieu thereof, adopt a system whereby only ten percent of all baggage offered for entry would be examined. It probably never occurred to the sponsors of this pescentage system of inspection that its adoption would open wide the doors for the entry from all over the world of contraband material of all kinds—narcotics, drugs, dangerous virus diseases, unauthorized serums and toxins for the treatment of man and animals, immoral and subversive literature, and plant pests and diseases.

Thus, at a time when both the risk of entry of alien plant pests and diseases, and the need for strengthening our defenses against such entry, is greater than ever, there is a strong urge for letting down the barriers. Growers, fortunately, are infomed as to these trends and are prepared to bring pressure to bear against them. However, there is another factor which may have a decided bearing on the future of foreign plant quarantine enforcement about which growers, and other citizens, are not well informed. This is our obligations to other countries assumed through the ratification of the United Nations Charter by the United States.

A number of years ago the comment was made, and given wide publicity, that what this Nation needed most was a good five-cent cigar. It could be stated at this time, in all seriousness, that what this Nation needs most is a clear and concise statement from a dependable and authoritative source as to just what obligations this Nation has assumed as a member of the United Nations and the manner, if any, in which these obligations have nullified the rights and privileges guaranteed to us by the Constitution.

The Plant Quarantine Act of 1912 delegates to the Secretary of Agriculture the authority to regulate the movement into the United States of plants, fruits, and vegetables from foreign countries. With the advice of specialists of the Department of Agriculture, the Secretary may decide that certain plant material should be excluded on account of the risk of entry of injurious insects or diseases, and that certain other plant material may enter under permit. These decisions reflect the best judgment of the Secretary and his advisers, and were arrived at after consultation with representatives of growers' oragnizations and state plant regulatory officials throughout the country. In no manner or form were they influenced by the representatives or officials of other countries.

Is this still the case? Or has ratification of the United Nations Charter brought about a condition whereby the Secretary, in the consideration of the promulgation of a quarantine directed against a foreign country, must consult fellow officials occupying positions of authority on a policy-making level, and give heed to the representatives of officials of other countries who are members of the United Nations? This question is prompted

*Quarantine inspectors are stationed at Pensacola, Jacksonville, West Palm Beach, Port Everglades, Miami, Key West, and Tampa.

by several current events:

1. The decision in the case of the California Alien Land Law.—The Judge of the District Court of Appeals, Los Angeles, California, before whom this case was argued, handed down the opinion that the Law had been nullified by the United States' ratification of the United Nations Charter; and furthermore, that the Charter has become the supreme law of the land, and judges in every State shall be bound thereby—anything in the Constitution or laws of any State to the contrary notwithstanding. In all probability this opinion will be appealed to a higher court. Nevertheless, the decision should cause the citizens of this Country to give serious thought to our obligations brought about by membership in the United Nations.

2. Activities of the World Health Organiaztion.—There is reason to believe that members of the United Nations World Health Organization have views with regard to certain public health procedures which are not wholly in accord with those held by responsible officials of the United States Public Health Service, and it may come to pass that our officials may be compelled to modify their position so as to conform with the recommendations of a World Health Organization Committee of Experts.

3. Food and Agriculture Organization's International Plant Protection Agreement.—Members of the United Nations' FAO in their Fourth Session in 1948 discussed the formation of a "National and International Reporting Service on Animal Diseases, Plant Diseases, and Insect Pests." Further discussions were held at the Fifth Session in 1949, and it was recommended that FAO should call a "meeting of specialists * * * to consider the desirability of modifying the Phylloxera Convention ratified at Berne in 1881 and the Plant Protection Convention of the International Institute of Agriculture ratified at Rome in 1929 **" In accordance with this recommendation, the Netherlands Government and FAO jointly organized a conference on this subject which was held at The Hague, Netherlands, April 26-May 3, 1950. The following countries were represented: **AFRICA**: Egypt, Morocco; **ASIA**: India, Indo-China; Israel; Philippines; Australia; **EUROPE**: Austria; Belgium; Denmark; Finland; France, Germany; Greece; Ireland; Italy; Luxemburg; Netherlands; Norway, Portugal; Spain; Sweden, Switzerland; United Kingdom; Yugoslavia; **LATIN AMERICA**: Chile; Costa Rica; Venezuela; Dominican Republic; El Salvador; **NORTH AMERICA**: Canada and the United States.

It should be stated at this time that the United States did not participate in the discussions of either the Phylloxera Convention in 1881 or the Plant Protection Convention in 1929. This was in accordance with an established policy at that time of our not participating in international conferences on plant quarantine matters. The reason the United States maintained this position for many years was that the Department of Agriculture felt that foreign plant quarantine action constituted a responsibility of the Department in that the only question for consideration was the protection of American agriculture against the introduction of insects and diseases from abroad. It was considered that plant quarantines, therefore, were not an appropriate subject for international consultation.

Indicative of the degree to which this government has deviated from this policy is the fact that the United States was represented at The Hague Conference last spring, and our delegate carried with him specific instructions from an Assistant Secretary of State, and served on the Steering Committee and was Chairman of the Subcommittee which drafted the final report.

The most interesting event of The Hague Conference was the drafting of an "International Plant Convention" (Agreement, in Cracker language.)

Following the Hague Convention, the proposed draft was further considered by a group of government specialists from Canada and the United States at an iformal meeting on June 8, 1950. The draft was then prepared in its final form, and submitted to the Secretary of State by the Director General of FAO on July 21, 1950, with a statement that the Agreement would be submitted for approval to the forthcoming session of FAO to be held in Washington, D. C., in November 1950, and, if such approval was obtained, it was planned that the Agreement should immediately be open for signature.

When the Agreement came up for discussion at the November session, a number of countries requested further time to study its several provisions, and other countries made recommendations for changes. It was agreed by the members of the Organiaztion to postpone action with regard to approval of the Agreement until the November 1951 Session of FAO, which will be held in Rome.

The text of the proposed Agreement is too long to incude in this article. Provision is made for the establishment of national organizations for plant protection: inspection, certification, and treatment of plants or plant products which move in international traffic; international agreements; requirements in relation to exports; and requirements in relation to imports. In the Article, No. V, dealing with imports, it is specified that each government reserves its right of inspection and of detention of plants and plant products, or of prohibition of their importation, even when the consignments are accompanied by a sanitary certificate. Provision is also made for settlements by Technical Committees of disputes regarding the interpretation of the clauses of the Agreement or of difficulties of a practical nature in regard to its application, or if one country wishes to challenge the grounds of measures prohibiting the importation of plants or plant products coming from its own country. The recommendations of such technical committees, while not binding in character, will become the basis for renewed consideration of the action for which the disagreement arose.

There can be no question as to the urgent need for improvement in the regulations of this and other countries which deal with the inspection, certification, and movement of plant material in international trade. In the consideration of suggestions for such improvements there is need for the best thoughts of officials engaged in plant pest control activities, as well as representatives of the commercial agricultural interests of the country. Recommendations for improvements and changes in this Nation's foreign plant quarantine regulations and procedures should be prepared in "open conventions, openly arrived at." In this particular instance, growers and state plant regulatory officials in this country were not informed as to

the comprehensive nature of the Agreement until last August, after it had been approved by the Department of Agriculture, a copy dispatched to the Secretary of State, and it was well on its way to the FAO Conference for approval.

Growers in Florida, when informed of this Agreement, immediately requested federal authorities to withhold approval by our delegate to the FAO until representatives of the Nation's agricultural industry had been afforded opportunities to study the document and express their views concerning it. It was pointed out that there was no need for speed in this matter, as the Secretary of Agriculture, under the provisions of the Plant Quarantine Act of 1912, has authority to take such steps as may be necesary to protect this country against the entry of additional major plant pests and diseases from abroad. Growers stresed the need for making a careful analysis of the Agreement to make sure that it contains no provision, stated or implied, that would jeopardize the authority now possessed by the Secretary.

As previously stated, FAO has postponed action with respect to the approval of the Agreement until the next meeting of the Organization, which will be held in Rome in November, 1951.

Growers, for their own protection, should keep themselves informed as to the scope and status of federal foreign plant quarantines. Individual States are almost wholly without authority to prohibit or regulate the entry of foreign plant material for the purpose of protecting their agricultural investments against the introduction and establishment of injurious plant pests and diseases. The States, and the growers within the States, must depend upon federal regulations for such protection. The Constitution reserves to Congress the right to regulate foreign commerce as well as commerce among the several states. In March 1926, the Supreme Court of the United States, in the case of the Oregon-Washington Railway & Navigation Company vs. the State of Washington (270 U.S.—87, 70 L. ed. 483) held that by the enactment of the Plant Quarantine Act of 1912 Congress has, under the commerce clause of the Constitution, delegated to the Department of Agriculture the entire field of the care of the horticulture and agriculture of the States so far as these may be affected injuriously by the transportation in interstate commerce of anything which can carry diseases to trees, plants, or crops.

(A dissenting opinion handed down in this case by Mr. Justice McReynolds and Mr. Justice Sutherland is interesting. It was stated, in part, that "It is a serious thing to penalize the efforts of a state to protect their people against impending calamity and leave them to the slow charity of a far-off and perhaps supine federal bureau. No such purpose should be attributed to Congress unless indicated beyond reasonable doubt.")

By joint resolution, Congress, in April 1926, amended the Act of 1912 so as to provide that until the Secretary of Agriculture, under authority of the Act, has issued a quarantine with respect to particular insects or diseases, the States might issue and enforce plant quarantines on account of such insects or diseases and thus directly affect the interstate movement of plants and plant products in spite of the fact that the Act of 1912 was in force at that time.

The effect of these decisions and amendments is essentially as follows: Once the Secretary of Agriculture has promulgated a quarantine against an insect or disease known to be established in any particular State or foreign country, the States may adopt regulations which parallel, but do not go beyond, the federal quarantine. If, on the other hand, the Secretary has taken no action directed towards a specific insect or locality, or repeals, without prejudice, an existing quarantine, the States may take appropriate action to protect themselves.

Federal control over imports from abroad does not stop at the jurisdictional lines of the several States; it reaches to the interior of a State and extends to the place where the importer intends to make disposition of the article imported. Thus, according to the solicitors of the Department of Agriculture, the Plant Board is without authority to interfere with the movement of plants or plant products entered under permit issued by the Bureau until they have been turned over by the carrier to the addressee. Needless to state, in the event our quarantine inspectors at ports of entry should find a major insect or disease in such a shipment, they will first destroy the material or have it removed from the State, and then give thought to their authority to take such action.

It is obvious that during recent years that the degree of risk of entry of alien insects and diseases has been increased. As pointed out, this is due to the great expansion of international air traffic, which provides a means for the rapid and wide dispersal of such pests. This risk could be increased further by changes in our national policies and clearing procedures governing the movement into this country of many commodities.

Along with this increase in risk comes an increase in the importance of and need for frequent and intensive inspections of our nurseries and field plantings, citrus and non-citrus alike; as well as research investigations for the purpose of developing means and materials for the control or eradication of such major insects and diseases as may slip into the State.

The State Plant Board has authority to take action necessary to prevent the introduction of insects and diseases; inspect agricultural plantings; control the movement of plants; and to apply eradication measures. Prevention of entry is accomplished, within limitations imposed by federal regulations, by quarantine inspectors stationed at the principal ports of entry. These inspectors also hold appointments as Agents of the United States Department of Agriculture and have authority to enforce federal plant quarantines. Inspection of nurseries is performed by a group of nursery inspectors. The work of these men has increased greatly in recent years as a result of the increase in nurseries and the number of plants propagated. Citrus and other plantings are inspected by the Board's grove inspectors. It is needless to state that the volume of work that must be performed by the grove inspectors increase each year by reason of the increase in the number of plantings. Other inspectors are assigned to the control of sweet potato weevils and white-fringed beetles in west Florida.

While the Board has authority to carry on research investigations, it has neither the facilities nor the personnel to engage in these ac-

(Continued on page 18)

Should I Buy A Citrus Grove?

ZACH SAVAGE, ASSO.
AGRICULTURAL ECONOMIST
AGRICULTURAL EXP. STATION

Entering any business enterprise as another means of making profits is not so serious a matter as entering that business as a sole means of support. But anyone who enters citrus production by investing all his assets in a grove, must realize a profit from it. If only partial payment is made for the grove with a mortgage for the balance, the situation is still more serious in that additional income must be had for interest on the loan and to amortize the debt.

For some time groves have been selling at high prices when measured in relation to previous sale prices of groves. To purchase a grove at a high price and pay 25 percent, or even 50 percent, cash would place the purchaser in a bad financial position in the event of a drastic drop in grove prices. There has not been many years since it was the exception for a grove to sell as high as $1000 per acre. For such a grove to sell at $2500 now would mean that if purchased at 50 percent cash the purchaser would still owe more on his mortgage than the full price of the grove a few years ago.

It might be well to consider the earning power of citrus groves over the past few years as an indication of what might be expected in the future in the way of returns for a livelihood and debt payment. During the 1948-49 season the Agricultural Extension Service, through the cooperation of citrus growers, obtained costs and returns on 200 groves. The average age of these groves was 26 years, and no grove with average age under 11 years was used in this tabulation. These groves returned $254 per acre after paying operating costs. Such returns would contribute well towards living costs, itnerest on debt, and debt payment. Of the 18 years of these records there were 4 seasons with better results than during the 1948-49 season. The following season, 1949-50, is expected to constitute the fifth season with higher returns above operating costs when the tabulations are completed than the 1948-49 season.

If a grove with the production and return record of the average grove in the 1948-49 season had been purchased at the beginning of that season at $2500 per acre with 25 percent of purchase price paid in cash, interest on the balance of $1875 per acre at 4 percent would amount to $75, plus a payment on a 20-year loan of $94, would leave $85 per acre for living and producing the following crop. At this rate of returns and expenses, 36 acres of grove would be necessary to net $3000 for living expenses. With no debt or interest load, 12 acres of grove would net $3000.

Table 1 shows the percentage of groves of these records by seasons at various levels of returns above operating costs. These figures represent the amount of money left to the grower after paying operating, or cash costs, for payment of interest, principal payment, living expenses, and/or for additional net income.

There has not been a season of this period of 18 years when there was not one or more groves failed to return operating costs. There were 4 seasons when more than one-third of these groves failed to return operating costs, two seasons when more than one-half, and one season when almost two-thirds of these groves failed to return operating costs. In such seasons heavy debt obligations would be extremely difficult to meet except on the very best groves.

There were 9 seasons when returns above operating costs per acre were less than $100 on more than one-half these groves (Table 2). There were six seasons when more than three-fourths of these groves returned less than $100 per acre above operating costs and two seasons when more than 90 percent of the groves returned less than this amount. There were eight, almost one-half, of the seasons, when in excess of 90 percent of the groves returned less than $200 per acre above operating costs. There were only three seasons of the 18 when more than 75 percent of these groves returned more than $200 per acre above operating costs and only 5 seasons when more than 50 per-

Table 1. — PERCENTAGE FREQUENCY DISTRIBUTION OF RETURNS ABOVE OPERATING COSTS FOR 18 SEASONS, 1931-49 GROVES AVERAGING OVER 10 YEARS OF AGE

Returns above operating costs per acre	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38	1938-39	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45	1945-46	1946-47	1947-48	1948-49
	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%
—$399 to —$300																0.5	1.4	
— 299 to — 200																0.9	7.4	
— 199 to — 100	2.2						0.4		0.4			0.4			0.5	8.2	12.1	
— 99 to — 1	17.8	55.4	24.7	35.5	20.9	4.8	30.7	29.1	37.8	10.2	3.8	0.8	0.5	3.6	0.5	17.3	44.7	2.5
0 to 99	42.2	39.6	64.9	48.4	42.9	42.6	53.0	58.6	44.3	60.1	35.1	7.5	0.5	4.1	3.9	31.5	26.5	14.0
100 to 199	26.7	4.0	7.7	10.4	22.0	28.7	13.3	11.9	11.0	25.2	32.1	17.5	6.3	10.9	10.2	25.6	5.1	20.5
200 to 299	6.7	1.0	2.2	5.2	8.3	14.7	2.2	0.4	5.3	4.5	16.8	19.6	15.3	17.6	15.6	10.0	1.4	22.5
300 to 399	4.4		0.5		4.7	6.2	0.4		0.8		8.0	16.7	19.3	19.4	12.2	2.7	0.9	14.0
400 to 499				0.5	0.8	2.2			0.4		2.3	14.6	16.6	11.3	13.2	0.5		10.0
500 to 599					0.4	0.4					1.1	10.4	18.5	8.1	10.2	0.5		8.0
600 to 699											0.4	8.3	9.5	9.5	8.8	0.9		4.0
700 to 799						0.4					0.4	2.1	7.2	5.9	12.2	1.4	0.5	1.0
800 to 899												1.3	4.5	2.3	4.4			2.0
900 to 999												0.4	0.9	5.0	3.4			0.5
1000 and above												0.4	0.9	2.3	4.9			1.0
— 387 to 1674	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 2.—PERCENT OF GROVES BY SEASONS THAT RETURNED STIPULATED AMOUNTS ABOVE OPERATING COSTS, 1931-49

Season	Percent of Groves with Returns Above Operating Costs of: Less than $100 per acre	Less than $200 per acre
1931-32	62.2	88.9
1932-33	95.0	99.0
1933-34	89.6	97.3
1934-35	83.9	94.3
1935-36	63.8	85.8
1936-37	47.4	76.1
1937-38	84.1	97.4
1938-39	87.7	99.6
1939-40	82.5	93.5
1940-41	70.3	95.5
1941-42	38.9	71.0
1942-43	8.7	26.2
1943-44	1.0	7.3
1944-45	7.7	18.6
1945-46	4.9	15.1
1946-47	58.4	84.0
1947-48	92.1	97.2
1948-49	16.5	37.0
Average 1931-49	54.5	70.9

cent returned a similar amount.

It can readily be noted from these figures that there has been much of the time over the past 18 seasons when a sizable proportion of these groves did not return enough above operating costs to contribute much towards living expenses for the owner. A much smaller proportion would have contributed $100 per acre for living expenses and $100 toward a debt load on the grove. If contributing $100 per acre toward living expenses, 30 acres of grove would be necessary to supply $3000 as living expenses.

The average grove of these records over the past 18 years would have paid operating costs, $56 interest payment on a $1400 loan at 4 percent, $70 payment on a 20-year loan and only $12 per acre living expenses. With $50 reserved for living expenses this rate of income would have paid 4 percent interest and liquidated a loan of only $860 per acre.

The rate of returns above operating costs of $219 per acre would necessitate 60 acres of grove to net $3000 after paying interest of $75 and $94 loan payment. The debt owned on this acreage at a purchase price of $2500 per acre and payment of 25 percent cash would be $112,500. With no interest or debt payments to be made, 14 acres would be necessary under these conditions to supply $3000 for living expenses.

The above figures are based on unusually good returns. Since average figures on 221 groves for one season have been used, it would be well to apply the returns realized from an average 212 groves for the 10-year pre-war period of 1931-41. The average returns from fruit were $97 with an average cost of production of $57, which left a net of $40 per acre. History may not repeat itself to the extent that the average net returns for ten years will be that low, but it is reasonable to assume that they might be that low, and the chances are that they will go considerably lower than at present. This net of $40 per acre would make an interest payment at 4 percent and a principal payment on a twenty-year loan amounting to only $444 per acre with nothing left for making the next crop nor any contribution to living expenses. At this performance rate, 75 acres would be necessary to supply $3000 for living expenses with no debt load.

A Valencia-grapefruit grove on which the Extension Service has records for twelve years was sold recently. This grove was not one of the best groves included in these records, nor was it one of the poorest. Its average age at the time of the sale was 27 years, and 41 percent of the trees were grapefruit. The price at which the grove was sold is not known by the writer, but an examination of its past record reveals that it was not worth a very high price. It paid unusually well for the last two seasons prior to the sale, when 48 percent of the returns from fruit and 62 percent of the net returns for the twelve seasons were received.

Stated another way, total receipts from fruit for the two seasons were 91 percent of the total receipts for the ten seasons prior to that time, and the net receipts were one and two-thirds times that of the total for the ten previous seasons. Receipts from fruit for these ten seasons, 1933-43, averaged $159 per acre. Production costs were $93 for this period, leaving a net of $66 per acre. This net figure would pay 4 percent interest and principal on a twenty-year loan on a debt of only $730 per acre. If the purchaser bought this grove at $1000 per acre and paid 27 percent in cash, this rate of income would service the debt and pay production costs, but would contribute nothing towards living expenses. With no debt load, this rate of performance would require 46 acres to net $3000.

Average figures for the 18-year peroid of 1931-49 for all record groves were materially boosted by five seasons with returns above operating costs in excess of $250 per acre each season. It is expected that the 1949-50 season will fall in this classification also, making six of the past 19 seasns when the average returns above operating costs for the groves included in these records exceeded $250 per acre. The rare combination of good yields and good prices in relation to production costs for 6 of the past 8 seasons contributed much to highly favorable net returns from groves and to the increases in grove prices. Growers of these records did not realize such favorable results for the 11 seasons of 1931-42. The seasons of 1946-47 and 1947-48 were not favorable for the Florida citrus grower and the latter season was the worst of the 19 seasons of these records. Returns from fruit failed to return operating costs in two of the past 19 seasons, the seasons of 1947-48 and 1932-33.

Groves that did not pay production costs during the six seasons, 1942-46 and 1948-50, were very poor groves. If the excellent financial returns of these seasons could be maintained in the future there would be justification for present prices of most groves. The above-mentioned Valencia-grapefruit grove netted an average of $542 per acre for the two seasons, 1943-45. This rate of income would pay interest and principal payment on a $6000 20-year loan if all the net were used for that purpose. Or, it would service a debt of $1875 per acre and contribute $373 per acre towards living expenses. If this rate of net income could be maintained, this grove would be a good buy at $2500 per acre.

(Concluded In Next Issue)

An Index Of Pasteurization Of Citrus Juices

THEO. J. KEW & M. K. VELDHUIS, U. S. CITRUS PRODUCTS STATION(2), WINTER HAVEN

In the course of some investigations of the effect of different temperatures and rates of heating used in the pasteurization of citrus juices, it became evident that there was need for a simple test for determining the presence of the pectinesterase enzyme. An investigation was started and a test developed that is more rapid than those now available. It has been found useful in the experimental work and should be of value in determining the adequacy of pasteurization in commercial packs. The test is simple, rapid, gives positive results, and is suitable for routine use in control laboratories of canning plants.

The test is based on the activity of the pectinesterase enzyme which hydrolyzes methyl ester groups to give acid groups which increase the acidity. This enzyme also destroys cloud stability in the canned product and if it is not inactivated during pasteurization, the juice in the upper portion of the can will be clarified and a sludge will settle to the bottom or a curd may form. Of the enzyme systems tested, the pectinesterase enzyme requires the highest temperature for inactivation. Canned juice should be as stable as possible and to this end it is considered desirable that all enzyme systems be inactivated. Excessive heating is also to be avoided to decrease the danger of scorching and the development of undesirable flavor changes. In general, the organisms which will grow actively in citrus juices are destroyed at temperatures below those required for enzyme inactivation.

One of the procedures investigated was that suggested by Jansen (1). This method was to centrifuge the cloud from the juice as much as possible; extract this cloud material with quarter molar sodium chloride, maintaining the pH at 7.5 and after filtration, assaying this solution for pectinesterase by the procedure described by Lineweaver and Ballou (2) and MacDonnell, Jansen and Lineweaver (3). With heated samples the pH changes occurred very slowly.

The test developed and patented by J. W. Stevens (4) was tried with the kind permission of the California Fruit Growers Exchange. This test involves the addition of barium chloride, pectin, a preservative and pH adjustment to 2.9-3.0. The samples were placed at 37°C. for 72 hours and then centrifuged. A clear supernatant liquid indicates enzyme activity. This test was satisfactory in many respects, but the elapsed time involved (72 hours) was objectionable and difficulty was experienced in judging borderline samples.

The next test was that described by Kertesz (5). This test had been devised for determining pectinesterase activity in tomato juice and involves the addition of methyl red indicator, and just sufficient alkali to cause the red color of the indicator to disappear. The reappearance of the red color was the indication of pectinesterase activity. This test worked very slowly in fresh orange juice and was not suitable as an indication of inactivation of the enzyme.

The use of a colored pH indicator has some advantages in that no elaborate equipment is required, so an effort was made to modify the test. The amount of enzyme was increased by using more juice relative to the amount of pectin. Equal volumes of juice and 1% pectin solution were used. This improved the test but it was still too slow to be useful. MacDonnell,

1. Report of a study made under the Research and Marketing Act of 1946.

2. One of the laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

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Jansen and Lineweaver (3) reported that this enzyme was largely associated with the suspended matter in citrus juices and used a buffer containing sodium chloride or sodium acetate to bring the enzyme into solution. This provided the suggestion that sodium chloride be used to bring the enzyme into solution so that it would act more rapidly. With the addition of sodium chloride, encouraging results were obtained and definite changes in the color were soon noticeable after adjusting the pH. However, Lineweaver and Ballou (2) had noted that the addition of suitable amounts of divalent cations (calcium or magnesium salts) resulted in an increase in pectinesterase activity. MacDonnel, Jensen and Lineweaver (3) showed that "by the addition of suitable amounts of various salts, the activity of orange pestinesterase was increased five-fold at pH 7.5 and more than 100-fold at pH 5". The use of calcium or magnesium chloride with the other reagents mentioned resulted in a decided stimulation in the enzyme activity. When salts were applied in amounts sugguested by MacDonnell, Jansen and Lineweaver (3) to citrus juices even with very low pectinesterase activity, the red color returned in four hours or less. With fresh juice the change was evident within ten minutes.

The effect of temperature was observed by dividing the reaction mixtures into two portions in test tubes, placing one at 40° F and the other in crushed ice. The samples held at the higher temperature turned red sooner than the refrigerated samples. However, as might have been expected from the literature (2) the effect was not great and since one of the objects was to keep the test as simple as possible, it was decided that room temperature would be used and this was found to work very well.

An effort was made to use a mixed indicator. It was thought a combination of methyl red and methylene blue (Johnson and Green (6) might improve the sensitivity of the test by providing a striking color change. The color change was from very light green to purple and very spectacular, but the test would not work. Apparently methylene blue inhibits the action of this enzyme.

No buffers were added or needed. Citrus juices are well buffered naturally.

The method we have found most satisfactory permits all the reagents to be added in two solutions. As many as possible of the reagents were combined into one solution. This solution contained the pectin, sodium chloride, calcium or magnesium choride, and methyl red. Sodium benzoate added to this solution will retard microbial growth but will not prevent degradation of the indicator. The main solution is prepared as folows:

Soution A

To one liter of distilled water, 12 grams of 150 grade pectin are added and thoroughly mixed

(Continued on page 16)

★ ★

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Reports Of Our Field Men . . .

NORTH CENTRAL FLORIDA
V. E. (Val) Bourland

The weather during the past couple of weeks has been very favorable and most all groves have started new growth and a great deal of bloom is making an appearance. This is a normal early bloom and should result in a very fine set of fruit for the next season. We still have quite a tonnage of mid-season fruit on the trees but it is being moved fast, and we will soon be in the midst of Valencia movements. Most growers are applying a Spring application of fertilizer, and thoroughly cultivating their groves. Considerable spraying is being done to keep insects and fungus infestations under control. Banks are being removed from young trees and they are being fertilized at the same time.

SOUTHWEST FLORIDA
Eaves Allison

Spring crops are struggling along after the last beating old man winter gave them. Tomato seedlings and plants have pretty well pulled through and the beginning of good weather at this time has started them to growing off good again. Cukes and melons have mostly been replanted. Celery has been doing fine, as have gladioli, though the latter has been checked by the cold. As usual, citrus in this area has escaped damage with the exception of very young trees in the Arcadia section which were killed back to the bank in places. There is a heavy normal bloom showing up at the right time along with the Spring flush of growth, which is proper. This hard winter has proved an asset to citrus in this territory. Pasture grasses in the open were killed, but new growth has started and is coming fast. Woods pasture areas are carrying the load.

POLK COUNTY
J. M. (Jim) Sample

Our Spring application of fertilizer is well under way and is being cultivated into the soil. This means that we are going to have plenty of strength in the tree to set a good crop of fruit from the excellent bloom that is now making an appearance. All varieties are showing that the bloom will be heavy and since it is an early bloom we should have a crop of excellent fruit. Fruit has been moving at a rapid rate to both the fresh fruit market and to processors at fairly good prices with optimism prevailing about the future movements. A great deal of interest is being shown in the Valencia crop but sales have not been too heavy as most growers are hoping for higher prices later in the season. However, some sales have been made and a few crops are moving to market at this time. Many growers are getting their spray program under way and will carry this operation through the entire season to produce an excellent crop of fruit this year.

PASCO COUNTY
George C. James

The old adage in Florida, "a cold winter brings ample rain" has certainly proved true this time. Most growers are getting their Spring application of fertilizer on at this time and with good moisture conditions it shouldn't take long to go to work. The bloom that started out in January was delayed somewhat by the cool weather but we are now beginning to have a full bloom with the very favorable weather conditions. Fruit is being moved at a very rapid rate and prices have been fairly good. This movement will be continued for the remainder of the season if good prices and weather continue.

WEST CENTRAL FLORIDA

The tangerine situation has been rather black in this territory. With a considerable acreage of this variety of fruit movements have been slow and prices could not be accepted as satisfactory. It is hoped that the balance of the crop can be moved, but there is doubt that all groves will be picked. Other varieties of fruit are moving at good prices and being moved at a rapid rate. Buyers are now showing interest in the Valencia crop and good prices are being offered by all channels through which this fruit is moved. There have been some crops sold but there exists a hesitancy on the part of a large number of growers because indications are that prices will be higher as the season progresses. Fertilizer is being supplied to help set a good crop from the bloom that is now making an appearance, and thorough cultivation is being practiced. Spray machines are also busy and will remain that way.

HILLSBOROUGH AND PINELLAS COUNTIES
T. D. (Tillman) Watson

Conditions in Hillsborough and Pinellas Counties are very good at this particular time. Most groves escaped our recent cold weather with negligible damage except in extremely cold spots. The present outlook is for a most normal bloom and a record set of fruit to stick on the trees. Of course, weather conditions will play an important part in the set of the new crop and it is hoped that we will have ample rain to take care of the needs of the tree. Practically every grower is well pleased over the crop of Valencia oranges that they have produced this season. They are of excellent quality with good sizes and very good color. Taking these facts into consideration we have prevailing a general feeling of optimism regarding prices that will result in nice profits on this variety of fruit.

SOUTH POLK, HOGHLANDS AND HARDEE COUNTIES

The cold weather, dormancy of trees and other factors are resulting in a very fine bloom for this section, and now with ample moisture it appears that we are going to set an excellent crop of fruit. Most of the early varieties of fruit were moved early last Fall and are blooming very nicely. Valencias are also showing good bloom and grapefruit too seems to have plenty of bloom. Fruit has been moved from some Valencia groves at prices that have been satisfactory and there is a great deal of interest shown by the buyers in this variety of fruit. Some growers are asking a higher price than now being offered and indications are that fruit will sell at higher prices. Fertilizer has been and is now being applied to most groves, a thorough spray program has been inaugurated and every thing points to an excellent crop of fruit for the next shipping season.

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We just got back from a trip over most of the citrus producin' areas of the state and it looks like we was goin' to have one of the best normal blooms in a number of years. Except in a very few places we have plenty of moisture right now, but a general rain would be right helpful. Grove owners is doin' everything possible to set a good crop and they'll keep on workin' to make an outstanding quality crop. Most groves has either already been fertilized or are now gettin' ready for their Spring application. Thorough cultivation is bein' done and most properties is bein' sprayed with materials that will do the most good in controlling insects and disease and at the same time providin' nutrients that will act as proper stimulants for new growth and young fruit development.

They is still some mid-season fruit to be shipped but real interest is now bein' shown in the Valencia crop and buyers is covering the entire field to find out about prices and movements for the future. Some Valencias is already movin' to market and prices should be called satisfactory and they is a general spirit of optimism that present prices will be maintained and may even advance to higher levels. It's our guess that the Velencia crop will fall short of estimates made prior to this time.

Vegetable crops has taken a beatin' from the weather this season but the good weather recently has done wonders in gettin' plants to growin' again. With favorable weather the balance of the season they will still be crops of ample quantity and excellent quality. Practically all crops goin' to market now is bringin' satisfactory prices. A little later there'll probably be heavy harvestin' all at the same time, but proper marketin' will do a lot to maintain a good price structure.

They is a lot of talk about shortages in a lot of vital materials and this is true in the fertilizer industry, but the production of agricultural commodities is vital to the whole world and you can be assured that fertilizer company executives as well as the Government will keep a continuous flow of materials needed in the production of foods to the growers.

Pastures that was so hard hit by the cold is now beginning to show new growth. It'll be a good thing for folks with pastures to consult their fertilizer folks as to the proper procedure necessary to restore the grasses to normal conditions at the earliest possible time and at the same time have them provide the greatest amount of nutrients.

Uncle Bill

AN INDEX OF PASTEURIZATION OF CITRUS JUICES

(Continued from page 13)

in a Waring blender. A little of the pectin sticks to the jar so the resulting solution is about 1% pectin. Then 17.54 grams of sodium chloride are added (0.3 M) and 14.7 grams of $CaC1^2.2H^20$ (0.1 M). To this 3 ml. of a freshlly prepared 1% alcoholic solution of methyl red indicator are added.

Solution B

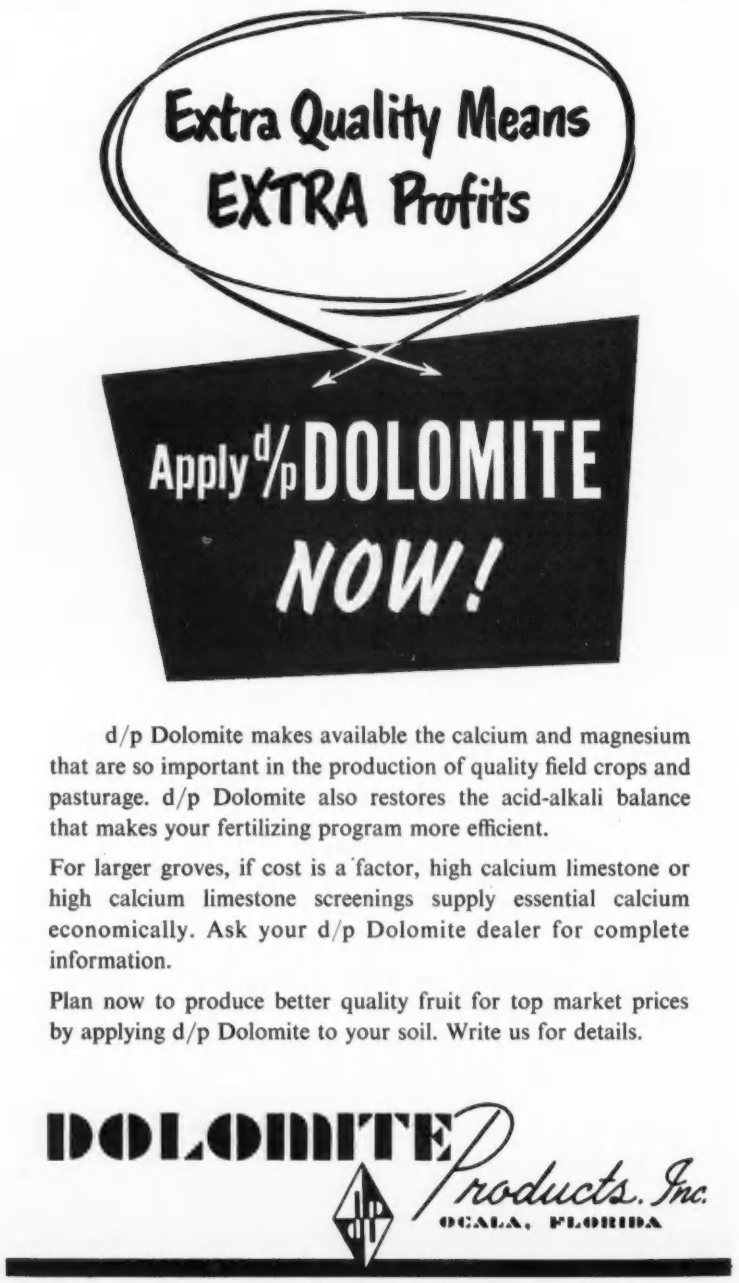
The other reagent is approximately 1.0 normal sodium hydroxide solution (40 g./liter).

In performing the test an equal quantity (20 ml.) of canned citrus juice and the reagent are mixed. The 1.0 normal sodium hydroxide solution is added with a medicine dropper with adequate mixing until the red color just disappears. By using approximately 1 N NaOH less dilution is obtained than with .1 or .01 N. alkali. Citrus juice is naturally buffered so that no difficulty is experienced in obtaining suitable pH adjustment with the stronger reagent. The sample is then observed for the return of the red color. If pectionesterase is active, methyl oster groups are hydrolysed in the pectin, acid groups exposed, and the solution turns more acid, changing the indicator back to red. In fresh juices the color change is sufficient to be noticed in about fifteen minutes. With heated juices up to four hours have been observed to elapse before the color develops. When the enzyme has been inactivated there is no color change.

As a confirming test for the presence of the pectinesterase enzyme, the samples can be stoppered and placed in the refrigerator overnight. If there is much enzyme activity, a solid gel will form. In borderline cases lumps will form which can be observed by slowly inverting the flask. This confirmatory test is at least as sensitive as the color change, the only objection being that several hours are required for the setting of the gel or forming the lumps.

If a pH meter is available, changes in pH can, of course, be detected more satisfactorily with it than with the color indicator, but such an instrument is not essential.

The test has been applied to several hundred samples. Comparisons have been made with the Stevens (4) test. In the experimental work mentioned at the start of this paper, time and temperature of pasteurization tests were made. The temperature intervals were 5° F. Both the new test and the Stevens test were applied to these series and temperature of enzyme inactivation was determined. In one series, enzyme inactivation at 5° higher temperature was indicated by the new test. In fifteen series the results were identical. In twenty-seven series of samples the new test indicated inactivation temperatures 5° lower than the Stevens test. In one series the new test indicated a 10° lower inactivation temperature. In sixteen series the new test indicated the temperature of inactivation and the Stevens test gave borderline or indecisive results. The new test indicates temperatures of enzyme inactivation averaging less than 3° lower than the Stevens test. A complete listing of the inactivation temperatures along with a discussion of the factors affecting this temperature is to be presented in



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another paper.

Since the temperature needed for enzyme inactivation is above that used to pasterize citrus juices, it is suggested that this rapid test for pectinesterase inactivation be used as an indication that adequate pasteurization temperatures have been used.

SUMMARY

The new procedure has been devised and described for testing the effectiveness of the pasteurization of citrus juices. Evidence of the presence of pectinesterase is used as the index. The test is rapid in that it can be completed in four hours. A color indicator is used to detect changes in acidity in the prepared sample. The test is simple, requiring only two solutions, and can be easily performed in the control laboratory. A confirmation of the test can be obtained by setting the prepared sample in the refrigerator overnight. The test agrees well with the results of other tests.

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EXTENDING PLANT QUARANTINES TO VIRGIN ISLES IS SUBJECT OF HEARINGS

Extensoin of federal plant quarantines to include the Virgin Islands of the United States will be considered at public hearings to be held in room 509 of the Department of Agriculture's Administration Building, Washington, D. C., on March 29, the Secretary of Agriculture announced recently.

A hearing at 10:30 a. m., of that day will consider the advisability of enforcing in the Virgin Islands the foreign plant quarantines affecting importation of plants and plant products into the United States.

At 1:30 p. m., on the same date, a companion hearing will consider the necessity for adopting domestic plant quarantine regulations to govern the movement of plants and plant products from the Virgin Islands to either Puerto Rico or the United States mainland.

Until recently the Plant Quarantine Act was regarded as inapplicable to importations into, or shipments from, the Virgin Islands. These Islands are now regarded as a District of the United States within the scope of that Act.

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PLANT INSPECTION AND QUARANTINE AND THEIR RELATIONSHIP TO CITRUS AND OTHER HORTICULTURAL INTERESTS OF FLORIDA . . .

(Continued from page 9)

tivities, and must depend, in large measure, upon the Florida Agricultural Experiment Station for the development of such information. That the growers in Florida appreciate the need for and value of such investigations is indicated by their support of the Experiment Station.

In the majority of eradication projects dealing with newly introduced insects or diseases, the lack of information as to the nature, life history, and means of control of the newcomers seriously handicapped the progress of the campaign and increased the cost. Little or nothing was known about citrus canker when it appeared in Florida about 1912. Growers, in their attempts to control the disease, only succeeded in spreading it from property to property and from one locality to another. At the beginning of the Mediterranean fruit fly eradication project, much valuable time was lost while investigators were seeking an effective means for controlling the insects.

Information of this nature with respect to major insects or diseases not yet established here, but which may come to us from a foreign country at any time, must be developed in that country. It is desirable, therefore, that the State of Florida, a State peculiarly exposed to invasion by reason of its geographical location and extensive international air traffic from abroad, provided for investigations of certain major insects or diseases present in countries to the south. This has been done in the case of tristeza, a deadly disease of citrus. Little or nothing was known about the nature of this disease or the manner in which it was transmitted in South America and other countries, where it had killed hundreds of thousands of sweet orange trees growing on sour orange stocks. Growers in Florida became concerned lest this disease be introduced into Florida, where, because of the absence of information so necessary for its control, it could destroy the large acreage of sweet orange trees growing on sour orange roots in this State. As a result of this concern, funds were provided for the Board's use in tristeza investigations in the Argentine Republic. Much valuable information as to the nature of this disease (it is a virus), its dissemination by the black citrus aphid, as well as susceptible and tolerant root stocks, has been accumulated. In addition, information of value has been accumulated with regard to a number of other important citrus insects and diseases not known to be present in Florida.

Provision should be made for the continuance of the investigations of major pests and diseases in the West Indies, Central and South America, either under the direction of the State Plant Board or the Florida Agricultural Experiment Station. The assignment of different scientists to tours of investigations in these countries would provide Florida with a group of specialists on tropical insects and diseases unequalled by any State or the federal government.

Eternal vigilance is the price of liberty. This applies to the liberty of our agricultural plants from major insects and diseases, as well as the liberty of the citizens of the United States.

INDUSTRY ADVISORY COMMITTEES ANNOUNCED BY SEC. CHARLES F. BRANNAN

Secretary of Agriculture Charles F. Brannan has announced the establishment of 17 industry advisory committees to consult with the U. S. Department of Agriculture on food distribution and related operations. The Secretary also said that additional committees will be established as the need arises.

Industries represented by committees established thus far include grain handling, wheat flour milling, breakfast cereal processing, baking, fruit and vegetable canning, oilseed crushing, edible oil refining, margarine processing, mayonnaise and salad oil manufacturing, grocery wholesaling, food retailing, public feeding, fertilizer manufacturing, dry edible beans and peas, rice, seeds, and dairy. Membership of these advisory committees will be announced in the near future.

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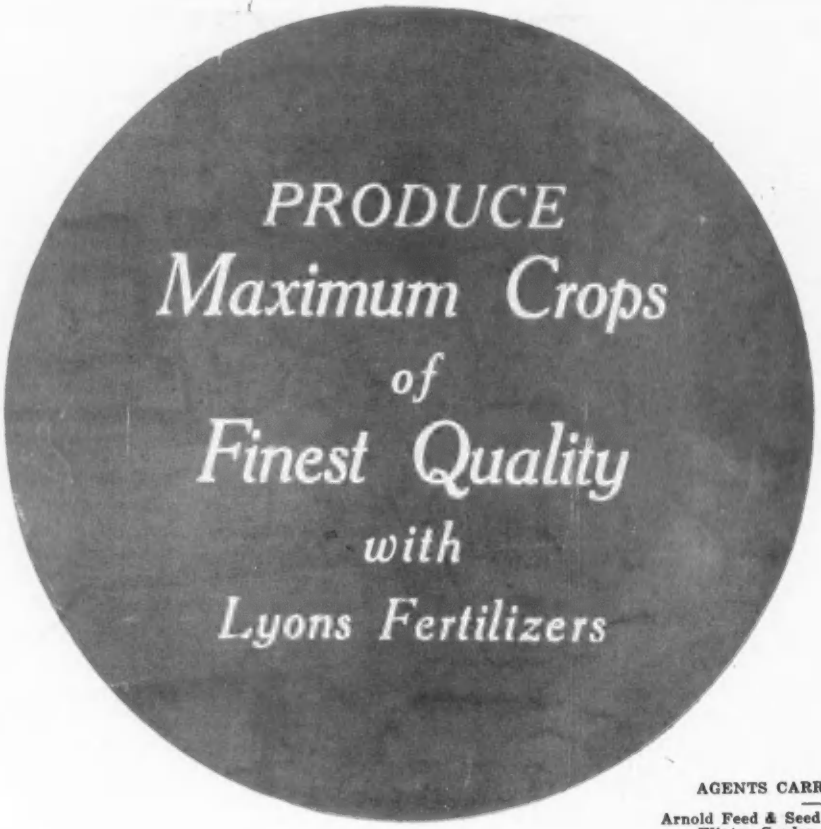

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